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Original Research

Soccer-Specific Fatigue and Eccentric Hamstrings Muscle Strength

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Abstract

Context: Epidemiologic findings of higher incidences of hamstrings muscle strains during the latter stages of soccer match play have been attributed to fatigue.

Objective: To investigate the influence of soccer-specific fatigue on the peak eccentric torque of the knee flexor muscles.

Design: Descriptive laboratory study.

Setting: Controlled laboratory environment.

Patients or Other Participants: Ten male professional soccer players (age = 24.7 ± 4.4 years, mass = 77.1 ± 8.3 kg, $\dot{V}O_{2max}$ = 63.0 ± 4.8 mL·kg^{-1}·min^{-1}).

Intervention(s): Participants completed an intermittent treadmill protocol replicating the activity profile of soccer match play, with a passive halftime interval. Before exercise and at 15-minute intervals, each player completed isokinetic dynamometer trials.

Main Outcome Measure(s): Peak eccentric knee flexor torque was quantified at isokinetic speeds of 180°·s^{-1}, 300°·s^{-1}, and 60°·s^{-1}, with 5 repetitions at each speed.

Results: Peak eccentric knee flexor torque at the end of the game ($T_{300eccH105}$ = 127 ± 25 Nm) and at the end of the passive halftime interval ($T_{300eccH60}$ = 133 ± 32 Nm) was reduced relative to $T_{300eccH00}$ (167 ± 35 Nm, P < .01) and $T_{300eccH15}$ (161 ± 35 Nm, P = .02).

Conclusions: Eccentric hamstrings strength decreased as a function of time and after the halftime interval. This finding indicates a greater risk of injuries at these specific times, especially for explosive movements, in accordance with

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epidemiologic observations. Incorporating eccentric knee flexor exercises into resistance training sessions that follow soccer-specific conditioning is warranted to try to reduce the incidence or recurrence of hamstrings strains.

Keywords: athletic injuries, isokinetic activity

Matt Greig, PhD, and Jason C. Siegler, PhD, ATC, contributed to conception and design; acquisition and analysis and interpretation of the data; and drafting, critical revision, and final approval of the article.

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